Cultural Corridors: An Analysis of Persistence in Impacts on Local Development

A Neo-Weberian Perspective on South-East Europe

Annie TUBADJI
University of the West of England,
Bristol, UK
atubadji@hotmail.com

Peter NIJKAMP
VU University
Amsterdam, The Netherlands

Adam Mickiewicz University,
Poznan, Poland
p.nijkamp@vu.nl

Abstract

Culture matters for economic development. This postulate has been a main conceptual concern for the "old" institutional economics (OIE) and has lately also been tested through neoclassical-inspired econometric techniques. This conceptual foundation has been confirmed in several quantitative studies on developed countries, in particular cases from the USA, Germany, and Italy. In less developed regions with a wealth of cultural heritage, in particular South-East Europe, this postulate is still an underexplored issue from the perspective of advanced econometric approaches. The aim of the present paper is to examine the impact of what are called South-Eastern European cultural corridors on welfare – and especially on total employment – at the local or regional level. Accounting for gross value added and sectoral specialisation, the effect of such corridors is examined by considering the distance to a cultural corridor: namely, the East Trans-Balkan Road (crossing Romania, Bulgaria, and Greece) as an explanatory factor for regional development – in particular, employment. Using the European University Institute (EUI) European Regional Dataset (ERD), as well as the geo-data from the Cultural Corridors of the South-East Europe website, we estimate a regression model using a 2SLS instrumental variable (IV) approach, with a pooled data set at the NUTS 3 level (Eurostat) during the period 1980 to 2011. Next, we triangulate our results by using the distance to the cultural corridor concerned as a treatment effect in a propensity-score-matching and difference-in-differences exploratory analysis. Our findings confirm the importance of distance to the cultural corridor under investigation as a strong predictor for local socio-economic development. Moreover, our results suggest that the slow evolution of culture over time is likely to lead to the gradual emergence of new geographical cultural centres and a new cultural path dependence built-up of persistence chains.

Key words: culture, persistence, path dependence, cultural corridor, place.

JEL classification: R32, R38, Z10, J60

1 Introduction

‘Culture matters’ is a claim having a long conceptual tradition in the original or “old” institutional economics (OIE) developed by Veblen (1915), Commons (1931), Ayres (1961), and Hamilton (1991). It is in the meantime also an accepted postulate in modern empirical neoclassical economics (see, for example, Harrison and Huntington 2001; Marglin and Marglin, 1996; Sen, 1999, 2004; Ottaviano and Peri 2004, 2005, 2006; Guiso et al. 2006, 2014; Tabellini 2010; Acemoglu and Robinson, 2010; Falck et al. 2012; Tubadji et al. 2014; Schuetz 2014; Alesina and Giuliano, 2015). However, the original OIE definitions of culture, as well as the conceptual perspective on its impact and the neoclassical quantitative operational mechanisms for empirically testing the impact of culture still remain poorly bridged (see Adkisson 2014). As a result, cultural impact remains in many contributions still either addressed through a vague and mbiguous definition or lacks the modern sound empirical demonstration of its paramount importance. In the present contribution we argue that a bridge between OIE and neoclassical empirical methods can be built and is needed, because cultural impact indeed plays an important role in socio-economic development. It deserves a thorough cognitive effort and toolkit to be combined and used for a wider and deeper understanding.

In the OIE tradition, the conceptual recognition and elaboration on the reciprocal causality between culture and economic/technological development is a prominent topic. As noted by David Hamilton: “To the institutionalist, behavior cannot be explained on an "individual" basis. There is no such thing as individual behavior. All behavior is cultural. Culture is subject to a process of cumulative development and change, and human behavior is therefore subject to this same process. Economic behavior, like all behavior, is subject to continued cumulative change and since the center of attention of the institutionalist is human behavior his whole economic structure assumes a Darwinian complexion.” (Hamilton 1991, 54).

Meanwhile, when turning to understanding culture, neoclassical economics tries to rely on sociological contributions for defining culture and for tracing the cultural impacts on socio-economic

development. The sociological literature, however, divides into three distinct and often mutually contradicting schools of thought (for a more detailed presentation of these three 'schools' of thought see Beugelsdijk et al. (2006)). First, there is a Marxist perspective, which argues that culture is mainly a by-product of economic development, and that initially economically less developed places are likely to achieve a similar level of cultural value development as more developed localities, once their economic welfare reaches the same level (see Marx, 1867). The reverse perspective is found in cultural determinism, that regards culture as a determinant of initial developmental conditions, which has a persistent effect over time and space (see Putnam 1994). 'Persistent effect' refers here to an exogenously determined effect that, once occurring, acts like an initial condition and becomes a characteristic that continues to exist beyond the process that generated it. In a sense, this assumes that culture, especially from a past period, is an exogenous factor for current socio-economic development. Finally, an intermediate approach can be found in the Inglehart (1977), Fukuyama (1992) and Hofstede (2001) sociology of culture, in which culture is interpreted as a locally-specific 'programming of the mind', which may or may not allow for certain developments under the same socio-economic conditions. This is the path-dependence school, which views culture as a 'bandwagon' which attracts more or less followers of a particular pattern based on the overall mass of participants (therefore also known as the 'network effect'). Path dependence assumes that culture is an autoregressive term and a lagged regressor explaining socio-economic development. In other words, cultural path-dependence is essentially a product of developing over time a culture - not just a static culture of a past period, but a changing entity itself that is endogenous to economics.

The above three paradigms have left profound traces in modern neoclassical economic thinking. For example, a Marxist oriented approach is often the basis for a total neglect of the relevance of cultural factors (Solow 1999; Glaeser 2001). In contemporaneous research, it tends to reoccur in a mild form in various studies on the economics of culture, where the focus of research is on culture and the artistic industries, often called the 'creative industries' (but in a slightly different sense from Richard

Florida's notion[1]); culture is here understood as a source of income, and its value creation function as a by-product and a positive spillover of its production process. In the same vein, research on cultural tourism often considers cultural heritage as a source of a particular economic sector specialisation and smart development (for related research, we refer to Throsby, 1994; van Duijn and Rouwendal, 2013; Campo and Alvarez, 2014). Next, the cultural-deterministic approach can be found in a variety of modern economic-historic studies on culture, or even in modern econometric models using an instrumental variable (IV) approach. In this approach, a historical event – or the distance to a historically significant location – is interpreted as a factor with a direct economic meaning (see Baumann, 1928; Knack and Keefer, 1997; Dell, 2010; Peman, 2011; Alesina et al., 2013; Fritsch and Wyrwich, 2013, 2014; Grompone and Sessa, 2014; Caicedo, 2014; Andersson and Larsson, 2015). Finally, the Inglehart and Hofstede approach matches closely with what is known in economics as cultural relativity studies, where local socio-economic patterns vary due to different cultural values and preferences, and where these preferences are understood as evolving over time on the basis of cultural interaction and/or migration. Illustrations of this stream of research can be found in: Tiebout (1956) – in particular, his notion of a culturally-driven variety of public goods provision – the tunnel vision effects of poverty on preferences (Levine 1980); the Balassa-Samuelson price-effect model influenced by a home-bias-driven inefficiency of trade markets (see Balassa, 1964; Samuelson, 1964), or in later research on the migration-diversity nexus[2], as well as in more recent cultural transmission and proximity-related studies[3]. The question of the nature of the process (persistent, path-dependent or else), was seriously addressed also in the OIE stream of literature. Unlike the neoclassical approach, we note that OIE focuses rather on "regularities of behavior" and subscribes

[1] Richard Florida (2002a,b, 2005) associates creativity with freedom to make a decision in one's practice. His definition of the creative professions spreads over a range of non-arts related occupations, such as surgeons, judges etc. Alternatively, when speaking of Bohemians, Florida refers to the artistic occupations, which are the subject of the economics of culture. These two notions are not necessarily disconnected, however, Florida claims that a concentration of Bohemians may prompt a concentration of workers from the creative occupations. But the two notions are essentially definitionally different (for more details see Moeller and Tubadji (2009)).

[2] See, amongst others, Divino and McAleer, 2007; Ottaviano and Peri, 2005; Hudson, 2008; Vioglander and Voth, 2012; Tubadji and Nijkamp, 2014

[3] See e.g. Rallet and Torre, 1995; Gertler, 2003; Callois and Aubert, 2007; Boschma 2005; Agrawal et al. 2008; Torre, 2008; Capello, 2009; Rodriguez-Pose, 2011; Acemoglu and Robinson, 2011; Rutten and Boekma, 2012; Saez-Marti and Zenou, 2012; Cohen and Ackland, 2012; Beebe et al., 2013; Leon, 2013; Bayer et al., 2014; Tubadji and Nijkamp, 2015; Huggins and Thompson, 2015.

to the idea that: "these regularities are specific to time and place and persist because of enculturation rather than because of some innate and constant human characteristics," Mayhew (1987, 588).

But there has yet been another socio-economic approach, which has basically laid the foundations for bridging the OIE and neoclassical approaches in an almost natural manner. This approach was suggested by Max Weber and, specifically, his economics of religion. Weber's most important cultural contribution was the establishment of the understanding of cultural attitudes as a source of local differences in occupations and productivity. This perspective is equally well-positioned towards the institutional and the neoclassical school. For the neoclassical school, this easily translates into different occupational and industrial structures in different localities. In the institutional domain, the understanding that people's cultural belonging in terms of values and attitudes is related to a certain type of economic choices and behaviour directly corresponds to what for example Veblen has identified as the "culture of borrowing", being a key factor underpinning German industrial development (Veblen 1915, 27). Or else, again by the OEI school, culture being defined as "correlated behavioral patterns" that are specific to time and place. Namely: "Values function as the standard of judgment by which behavior is correlated" (Bush 1987, p. 1077). But what is perhaps most important from the perspective of neoclassical and institutional economics, Weber was the first to link the institutional approach to culture on the basis of an empirical quantification of culture. In his early work on the 'Protestant Ethics and the Spirit of Capitalism' and the so-called religious economics school, the main methodological idea at stake uses to quantify the cultural-attitudinal rationale and its differences through the religious belonging, as one very appropriate (especially at that time) proxy for local cultural values.

The present study adopts a neo-Weberian perspective by addressing Adkisson's (2014) question whether it is possible to properly quantify and demonstrate empirically with modern econometric tools the role of culture in socio-economic processes. Our neo-Weberian perspective is founded in what is called the Culture-Based Development (CBD) approach, which is a continuation of the Weberian understanding of local development as a function of the spatially-varying cultural attitude

towards socio-economic development and progress. In general, CBD is a concept of individual and group cultural bias on human economic choice, resulting from the influence of the locally varying attitude on human preferences, which generates effects on individual and local socio-economic development in a persistent path-dependent manner (Tubadji, 2012, 2013; Tubadji and Nijkamp, 2014, 2015).

Here the CBD conceptualization is applied to cultural corridors in the South-Eastern part of Europe. Put differently, the focus of the research is on the distance to a cultural corridor, defined here as a vector of geographical centres of tangible and intangible cultural heritage dating from different time periods. Thus, unlike the currently popular quantification tools in empirical economics, using e.g. self-reported attitudes from the World Value Survey or Hofstede Indices measuring different cultural dimensions, the current study uses a unique concept of a cultural corridor and its empirical operationalization – its geolocation and the geographical distance to it – in order to quantify culture and its impact. The definition of a cultural corridor is especially compatible with the OIE take that: "[t]he institutional structure of any society incorporates two systems of value: the ceremonial and the instrumental, each of which has its own logic and method of validation" (Bush 1987, p. 1079). The distinction between the ceremonial and instrumental, consists of: "Ceremonial values correlate behavior in an institution by providing standards of judgment for invidious distinctions, which prescribe status, differential privileges, and master-servant relationship, and warrant the exercise of power by one social class over another. Instrumental values correlate behavior by providing standards of judgment by which tools and skills are employed in the application of evidentially warranted knowledge to problem-solving processes (Bush 1987: p. 1079). Following the above reasoning, the cultural corridor promotes a development by drawing new populations into the systems of ceremonial and instrumental valuations that have proven most effective in terms of bringing accumulated knowledge and tools to bear on economic and social challenges.

Next, our CBD definition of culture and its quantification through a cultural corridor is then employed in the context of an empirical analysis in the spirit of a neoclassical approach. We employ this

quantification of culture and its impact for an explanatory 2SLS regression analysis, complemented with an IV approach (and other relevant econometric methods). For this purpose we use a uniquely-created geocoded database on the South-Eastern European cultural corridors, which has been especially designed for our study. Our research addresses, in particular, the East Trans-Balkan cultural corridor, which passes through Greece, Bulgaria, and Romania. The places whose geo-locations were collected, have been explicitly selected and mapped by international expert groups of UNESCO, ICOMOS, the Council of Europe, and affiliated academic institutions. Thus, our statistical information originates from a refined historical and meaningful representation of the tangible and intangible cultural memory of relevant connected centres of socio-economic development in the past. Our aim is to demonstrate how the OIE conceptual understanding of culture and the neoclassical empirical toolkit can harmoniously cooperate for obtaining empirical evidence on the paramount role of culture in socio-economic development.

The structure of the present paper is as follows. Section 2 introduces the Culture-Based Development (CBD) definition of cultural corridors as a source of socio-economic development and a basis for the channels of impact on local employment and productivity, while it also formulates hypotheses on plausible positive or negative effects that can be expected from this particular source of cultural impact. Section 3 then presents our unique database containing geo-coded information about the East Trans-Balkan South-Eastern European Cultural Corridor (ETB SEE CC), and shows how it can serve to operationalise the CBD definition and contribute to a manageable applied approach. Following this, Section 4 provides our econometric estimation results and their interpretation. Finally, Section 5 makes some concluding remarks on our empirical findings in the context of socio-economic development, cultural persistence, and the regional development of 'urban centres' related to such cultural corridors.

2 Culture-Based Development: Cultural Corridors and Socio-economic Development

2.1 Definition of a Cultural Corridor

Culture-Based Development (CBD) is a concept which has emerged only recently. It aims to explain place-based development discrepancies and other economic irregularities/inefficiencies through their cultural bias on individual and aggregate economic choice or action. In particular, CBD defines culture as an entity composed of tangible and intangible cultural assets and expressions of values, which are additionally subdivided into living culture (observed in the current time period) and cultural heritage (generated in previous time periods) (see Tubadji 2012, 2013). This broader conceptualisation of culture allows its many different aspects to be encompassed in a complex latently present entity, which is often associated with a locality or a particular ethnic group[4]. Empirically, CBD introduces culture as a latent variable that is quantifiable as a vector of cultural components (generated, for example, by means of a principal component analysis (see Tubadji and Nijkamp, 2014)), or which can be estimated through partial-least-squares path modelling and related non-parametric techniques (see Tubadji and Nijkamp, 2015). In the present study, we argue that the notion of a cultural corridor offers an interesting possibility for operationalising the CBD concept in a geographical framework. A cultural corridor may provide an even more refined approach than the above mentioned statistical methods for a quantification of the latent notion of culture, since in our study the components of a cultural corridor were (qualitatively) selected by the expert opinion of cultural historians, architects, and experts on local institutions of values and meaning.

The notion of a cultural corridor belongs to the realm of cultural historians and heritage experts. It has, however, found a prominent place in international culture-oriented organisations, such as

[4] It is plausible that a rather restrictive definition of culture, narrowed down to only one expression of culture (e.g. religion or arts), leads to incomplete information on this concept, and is therefore bound to lead to a biased estimation of the impact of culture on local development (see Tubadji, 2014). Clearly, a complete omission of the local cultural capital as a factor variable in an economic equation might lead to an even more serious bias of under-specification due to the elimination of information on a significant determinant of local development (see Tubadji, 2012, 2013, 2014).

UNESCO, the Council of Europe, and ICOMOS[5]. Therefore, before addressing cultural corridors from a CBD perspective, we first give the description given by the Council of Europe experts involved in the identification of the South-Eastern European cultural corridors: 'the traditional territorial axes in the region [of South East Europe] along which cultural values, ideas, innovations, and so on, have been circulating in constant continuity of links, influences and interactions' (Teodorescu 1974)[6]. Furthermore, the cultural corridor is 'a historical vector, a territorial axis evolved in time, along which there has traditionally been movement and exchange' (Krestev 2005)[7].

The OIE definition of culture as foci of ceremonial and instrumental valuations that influences local socio-economic development naturally fits conceptually with the here suggested definition of cultural corridor. However, this definition has as yet never been operationalized in in meaningful quantitative terms. When Adkisson (2014) asks whether the institutional notion of culture can be quantified adeqautely, our answer is confirmative.

We can do this by reinterpreting the definition of a cultural corridor in a quantitative language, as follows: 'a vector of identified geographical locations of historically-established and recognized centres, that cluster tangible and intangible cultural heritage as mutually connected carriers of memory for local meaning'. By adopting this CBD definition of a cultural corridor, we can make several important assumptions on its expected impact, but also the cultural corridor is now quantitatively identifiable as a geolocation(s) characterized by specific local culture.

It should be added that the expression 'centres' in our definition does not necessarily refer to urban centres, but may also include villages characterised by interesting types of church architecture as a result of local creative spirit and the concentration of building construction talent. Clearly, the modern

[5] Equally interestingly, from an empirical perspective, the same expert groups have implemented an impressively detailed and highly professional mapping of these cultural corridors for the case of the South-East European Region.
[6] See http://www.seecorridors.eu/filebank/file_272.pdf.
[7] The official website of the South East Europe Cultural Corridors provides another, slightly more precise and more informed definition, which reads: 'South East Europe has been a real crossroads of civilisations and religions through the centuries; a mediator between the East and the West, the North and the South, transpierced by internal connections and influences, bound up by common historical routes. As a result, in time, cultural corridors in the region have been formed – trans-national axes of centuries-old interactions – the living memory of the civilizations and strong connections between the peoples, which inhabit the region. Please, get to know these cultural roads, which have preserved their vitality from the ancient times until today!', see: http://seecorridors.eu/?w_p=23&w_l=2#

notion of an urban centre (see Kramer and Diez, 2012; Nijkamp, 2008; Arribas-Bel et al., 2013) as a focal point of socio-economic development may reflect the same thing, but then put and adapted in a historical perspective and context. The basic idea is that such centres function as pull and push forces of meaning and values that are essential for the socio-economic development in their times.

Operationally, a cultural corridor is defined in this study as a poly-line, formed by the precise latitudes and longitude points of nearly 280 locations of cultural points (including fortresses, villages important for handicrafts, historic towns, churches and monasteries, etc.). These locations were identified as the building elements of the East Trans-Balkan Road (one of the nine South East Europe corridors defined by the ICOMOS team). The information about this corridor and the locations belonging to it, accompanied by detailed qualitative descriptions, were obtained from the website of the Cultural Corridors of South East Europe: http://seecorridors.eu/?w_p=23&w_l=2&w_c=6 . For the purposes of this study, the geo-coordinates of these physical locations were extracted from Google Maps. Next, the cultural impact is measured by the geograpgical distance to this cultural cultural corridor and the statistical significance of this distance for local socio-economic development. Put differently, we want to quantitatively analyse if living in a proximity to the corridor affects socio-economic performance.

After the above CBD interpretation of cultural corridors, the question arises: is there a persistence of tangible and intangible local development, or, after a certain time, can local prosperity at a time be followed by a local decline in a subsequent period due to the cultural persistence of values? If the latter holds true, cultural impact might serve to explain the fall and rise of local development centres or of cultural corridors as a whole. The next sub-section (2.2) contains an argumentation of these assumptions.

2.2 The Cultural Corridor and its Mechanism of Impact

The notion of a cultural corridor expresses a strongly region-and-innovation related type of mechanism of impact by the ‘cultural milieu’ on local development (see Jacobs 1961;Westlund et al. 2014; Trax et al. 2015; Huggins and Thompson 2015). Namely, local economic development is driven

by a locally-specific cultural attitude (in the form of: (a) social capital between people with homogeneous attitudes to progress[8] (Bush 1987); and (b) segregation resulting from clustering motivated by the positive spill-over effects for spatial proximity[9] (Axelrod 1997; Akerlof 1997). Naturally, culture-producing agent are attracted to economically prosperous places for the higher demand which is concentrated there. However, as shown in numerous studies (for most recent contribution, see Andersson et al. 2014), even when controlling for the demand factor, it is also the clustering of other artists that explains the concentration of artists in a locality. Thus, culture concentrates in places on account of both their economic prosperity and their specialisation as a cultural sector. On the other hand, the driver of economic development – innovation , especially destructive innovation, causes changes in the spatial concentration of economic growth. For instance, with the advent of the age of the new Silicon-Valley-type of innovation age, the economic significance of the spatial foci of previous industrial economic development (such as mines) declines. However, the social capital that they have concentrated, and the artistic output and milieu that they have created, remains in these now declining spatial foci as a form of capital – local cultural capital (as defined by Tubadji 2012, 2013). Naturally, the further back in time that these foci are identified, the more pure a measure of cultural capital they are today. The spatial concentration of such past foci of interest drives a mechanism which has two components: (i) local cultural capital creates the cultural cost of migration, and thus keeps in the locality a part of its human capital that otherwise would have been washed away by economic incentives (see Sjaastad 1962; Harris and Todaro 1970; Falck et al. 2014); (ii) these past foci of development are also related to the concentration of transportation networks. The latter is partially endogenous to the current economic development level, but its significance for economic development is crucial, as new investments in transport infrastructure are costly, even if they are possible and realistic investments (see Mori and Nishikimi 2002; Celbis et al. 2014). Thus, a cultural corridor unites within itself previous foci of interest which are proxies of past

[8] See Inglehart (1977), Inglehart and Welzel (2005, 2010) and Hofstede (2001).
[9] On sorting, see Arrow (1951, 1963), Axelrod (1997), Schelling (1996, 1978), and on cultural proximity, see Head and Ries (2008), Diyarbakirlioglu (2011), Cervellati et al. (2008), Cervellati et al. (2011), Kreiser et al. (2013).

cultural activity and lie on past significant trade and communication roads. Nowadays, neither culture nor transportation are primarily concentrated there. That is why, in a purely classical Weberian sense, these cultural corridor foci carry the identification of places where, historically, people's attitude towards economic development was shaped in a particular direction and according to a certain understanding of technology and progress. The historical relevance of the meaning of the corridor as a proxy for attitudes is the same as the approximation of attitudes by religion or distance to Wittenberg[10] (see Weber 1905; Becker and Woessman 2009). The cultural corridor is, however, further augmented with its relationship to the idea of transportation economies of scale, or, in other words, economies of scale due to connectivity between places which used to concentrate the most human capital and economic prosperity at a certain time period, and which were operating with particular set of attitudes and ideas for production and development. Human capital, even if incentivized economically, will be disintivised to leave places with a vigorous cultural milieu and high social capital. Therefore, the spatial shift of employment and skilled people due to technological innovation, urbanisation and the rise of new foci of socio-ecoomic development is likely to happen at a closer distance to the past cultural corridor of socio-economic development in a locality. Modern entrepreneurs will try to locate their new businesses near to the previously existing roads and social capital, and the new foci of development will locate close to the old ones, as far as the resources for the new technology will allow.

We can now summarise the above propositions in a testable operational CBD model for the proximity of the centres of localities to a cultural corridor. Therefore, we specify the following model (1):

$$HC_{i(t-1)} = \beta_1 CG_{it} + \beta_2 X_{1i(t-1)} + e_1 \quad (a)$$

$$HC_{it} = \beta_3 HC_{i(t-1)} + \beta_4 GVA_{it} + + \beta_5 X_{1it} + e_2 \quad (b)$$

$$IS_{it} = \beta_6 HC_{it} + \beta_7 X_{2i} + e_3 \quad (c)$$

$$Empl_{it} = \beta_8 IS_{it} + \beta_9 GVA_{it} + e_4 , \quad (d) \qquad (1)$$

[10] This refers to the diffusion of Protestantism from Luther's home town of Wittenberg.

where *i* denotes a particular locality *i*, and *t* stands for the current period of time; *t-1* denotes the period before the current influx of external human capital to the locality; *HC* stands for the share of human capital in locality *i*; *GVA* denotes the gross value added to be interpreted as the investment potential in the locality concerned; X_1 denotes a vector of the standard economic incentives for labour migration, such as wages, cost of living, etc.; *CG* is the source of cultural gravity; *IS* is the sectoral specialisation; X_2 denotes the economic and natural endowments of the locality; *Empl* stands for the volume of local employment; and *e* denotes the standard error of the respective equation of the system.

The above model (1) suggests that a certain type and level of human capital is concentrated at a particular time in a particular place. In an Inglehart-Axelrod sense, specific human capital clusters emerge around a particular concentration of cultural capital. And also (in the Weberian tradition), it can be expected that this clustered human capital carries culturally-specific skills and occupation-related preferences (equation (a)). Thus, the available human capital decides – on the basis of its skills and preferences – how to exploit the local economic resources. In the next period – given these skills, the economic endowments, the embodied productivity and the wage distribution – a certain centre starts to attract human capital from outside as well (equation (b)). Thus, both the locally-generated and externally attracted human capital in the second period determines – together with the local economic endowments and the economic structure of the place – the sectoral specialisation (equation (c))[11]. Finally, local employment is a function of local sectoral specialisation controlled for local productivity of human capital (equation (d))[12]. The source of cultural gravity in this context, i.e. the cultural factor influencing the model, can be approximated by, amongst other things, the distance of

[11] The cultural diversity that occurs due to the inflow of people with different values creates a disruption of the local cultural milieu. Yet, until a tipping point is reached when the local cultural milieu will no longer be predominant in decision making, the local culture will have a persistent effect.

[12] Local cultural gravity and its effect on the interaction between culturally-distant agents still influences the efficiency of local productivity by the dominant effect of local culture.

a locality to a historic cultural corridor. This particular and novel operationalisation of model (1) will be presented in the next section[13].

3 Empirical Analysis of the SEE CC Economic Impact

3.1 Database

To empirically address the essence of the hypothesis behind our model (1), we use two combined datasets, one of which is uniquely created for our research purposes. The first dataset, based on the European University Institute (EUI) European Regional Dataset (ERD), offers an unbalanced panel of local productivity and regional employment by economic sector for Greece, Romania and Bulgaria on a NUTS-3 level for the period 1980 – 2011. From this dataset, we obtain indicators about total employment, employment per sector and gross value added, which serve as the basis for our main explanatory variables. The second dataset contains the estimated shortest distance from each NUTS-3 region to the East Trans-Balkan South-Eastern European Cultural Corridor. This information was obtained by first finding the centroid of each NUTS-3 region. Next, we determine the geo-locational coordinates for each of the listed 280 items of the East Trans-Balkan South-East Europe Cultural Corridor. Finally, the shortest distance is estimated as the distance from a point (the NUTS-3 centroid) to a poly-line (formed by the geo-locations of the cultural corridor items). The source of the elements of the corridor is the South-East Europe Cultural Corridor website www.seecorridors.eu; their geo-locations were identified and extracted from Google maps, which provides the longitude and latitude, of either the particular cultural endowment (e.g. a fortess) or more generally the nearest geographic

[13] This process might, at first glance, seem deterministic when considered for just one period of time. But put in a dynamic perspective, model (1) assumes that, even if the development of local culture takes place more slowly than economic events, it will also evolve based on the cultural capital belonging to the incoming foreign capital. Migration is economically driven, but is strongly subject to cultural gravity and interaction between cultures. Thus, the process of cultural change is determined by the culturally driven reallocation of human capital between localities. According to cultural gravity, a more culturally open milieu will change faster, but will also attract more human capital, and this will develop into an important centre of development, and, if it stays open, the effect may persist, while, if it turns towards over-dominance (which normally is the threshold of a continuously power-accumulating entity (the 'empire effect')), this will ultimately lead to less human capital concentrating in this locality, and gradually the locality will lose its economic power. Thus, a break in the chain of the persistence of the cultural effect on local development will happen in this locality.

location identifiable (i.e. the closest village to a fortress). Moreover, in the presence of very high ethnic, religious and linguistic homogeneity in the countries under investigation[14], any familiar measure for culture, such as religion or language, will be powerless to capture quantitatively the cultural capital differences in these localities.

Next, in order to obtain an appropriate sector specialisation, we implement several transformations of the EUI variables. Like Angulo et al. (2015), we obtain the local shares of sectoral employment as a ratio of the share of total employment in this locality, by using the formula:

$$SI = (Es/Est)/(Er/Et)\ , \tag{3}$$

where *SI* represents the specialisation index; *Es* stands for local employment in the given sector of interest; *Est* represents the employment in this sector in the country; *Er* stands for total local employment in all sectors; and *Et* denotes total employment in the country. Using the sectoral indices, for every sector, we construct a dummy variable, equal to 1 when the SI index for the specific sector exceeds 1. In this way, we ultimately create as regressors six dummy variables denoting specialisation in, respectively: *si_agri_d* – agriculture; *si_ind_d* - industry excluding manufacturing; *si_constr_d* – construction; *si_trade_d* - wholesale, retail, transport and distribution, communications, hotels and catering; *si_fin_d* - financial and business services; and *si_non_m_d* - non-market services.

The overall number of observations in our final compiled data set amounts to 2850 observations covering the period 1980 – 2009 for Greece and the period 1990 – 2009 for Bulgaria and Romania. Each year covers all NUTS-3 regions of the three countries. The years of the crisis after 2009 are excluded, owing to the specific shock conditions that might bias the results (this especially in a view of the fact that 2009 was the benchmark year for the crisis-related developments that happened in Greece). The next section will present the data handling procedure, through a pooled data set in order to test the main hypothesis behind our model (1).

[14] In particular in Greece there is about 99% of the population in the same religious belonging. Further, Cypriot Greeks for example share the same religion and language, officially, but are carriers of group-specific attitudinal characteristics, known mostly from anecdotal evidence as often opposing to the average Greek attitude. In Bulgaria, linguistically and religion-wise the population has been submitted during different historic periods to forceful conversions and change of names etc., so it is highly latently heterogeneous a notion what a Bulgarian Muslim is for example and how this category has to be identified adequately as a carrier of a particular cultural attitude.

3.2 Estimation Strategy

The above data allow us to test the main hypothesis underlying our model (1). To sum up, the working hypothesis, on which model (1) is based, can be stated as:

H01: In the course of time, historic cultural factors (even if moderated by immigration in a locality) affect local sectoral specialisation in the locality at the current time, and thus ultimately shape (partially) the level of employment in this locality.

To test our hypothesis and obtaining a robustness check of the results, we examine the hypothesis using two alternative estimation methods (i.e. applying the recommended within-method triangulation (see Downward and Mearman 2007)). We will first use an instrumental variable (IV) approach combined with a 2SLS regression, and second, we conduct several types of propensity-score-matching and difference-in-differences methods in order to identify the impact of culture on local employment.

In particular, the 2SLS IV approach will have two alternative operationalisations. The first operationalisation, following the trade and home-bias rationale, uses the distance to the cultural corridor as an instrument for the culturally-biased specialization in trade[15] and conducts a just-identified 2SLS estimation of this specification. As a second alternative, we follow a Weberian proposition that there exists a culturally-driven local occupational preference. Based on this premise, actually all sectoral specialisations can be considered proxies of local cultural preferences. Therefore, we will use all the dummy variables for specialization in all sectors as instruments for distance to the cultural corridor, which is used as a regressor, together with local gross value added, in an attempt to explain the local level of employment. This second alternative represents an over-identified 2SLS estimation with 6 instrumental variables for the culture-related regressor distance to the cultural corridor.

Finally, we triangulate (Downward and Mearman, 2007) the results obtained through the 2SLS method by using a propensity-score-matching and difference-in-differences approach. We define

[15] For a recent contribution on the mechanisms behind the significance of trade in particular as a factor for regional development, see Dascher and Haupt (2011).

distance to the cultural corridor in three alternative ways – up to 10km (treatment 1), up to 15km (treatment 2) and up to 20km (treatment 3). We use a probit model to estimate the propensity first in levels (of employment), and then – as a dependent variable the difference between the propensity in each two consecutive years for each NUTS-3 region available in our data set (a 1 year difference defining the before and after state in our data set). The latter estimation serves as our difference-in-differences estimation. Next, we implement a matching procedure for each of the above-mentioned dependent variables (in levels and in differences) separately. To match the scores we use alternatively one of the three treatments using comparison-wise the following matching methods: nearest neighbour matching, kernel matching, and stratified matching, while presenting in addition a simple t-test and a test with control variables and common support intervals.

In all types of estimations conducted, both IV- and propensity-score-related, we always use controls for year, country, and capital city.

4 Results

4.1 Instrumental Variables and 2SLS Estimation

4.1.1 Prefatory Remarks

The first introduction to the data is presented in summary statistics format (see Table 1a). Sharing a close mean and standard deviations, total employment (emp_t) and gross value added (gva) explain each other almost completely. This means that the rest of the variables will be able to address, in a meaningful model, our intended investigation regarding the additional cultural impact.

+++ insert Table 1a about here +++

The first part of our empirical analysis uses a 2SLS instrumental variable (IV) approach. The main motivation behind using IVs is that we aim to estimate a model where total employment is explained by economic capital (approximated by GVA) and economic structure (our sectoral index dummies). But both total employment and sectoral employment are – according to the Weberian claim for

cultural impact on productivity and occupational choice – culturally endogenous. Therefore, we need to extract the cultural bias from the regressor – the sectoral specialisation – by finding an IV related to this regressor, but not with the error term of the regression itself. Our strategy is now to use the distance to a historical corridor – the East Trans-Balkan cultural corridor specifically. As we know from urban economics, distance to the urban centre is one of the main determinants of the economic specialisation of production. Furthermore, specialisation is related to occupational choice, while – besides natural endowments – occupational choice in a locality depends on cultural preferences. Thus, if there are indeed traces of cultural persistence, they might be a reason for a sufficient correlation between the past and present centres of development, so that the distance to the cultural corridor may be expected to be correlated with the urban centres today. As we can see from Table 1b, such a correlation does indeed exist. Yet, it is not that high, which indicates that cultural impact is not completely determining the process.

+++ insert Table 1b about here +++

To identify our 2SLS IV model, we again consider Table 1b. As we see, we have a positive and relatively satisfactory correlation only between specialisation in trade and distance to the cultural corridor. Theoretically, however, we may expect that all specialisation variables are related to this distance. Therefore, we follow, alternatively, first the statistical and then the theoretical rationale in order to be sure that our estimation model is not under-identified theoretically. In other words, first we use a just-identified 2SLS IV model, where distance to culture is the instrument for specialisation in trade. This is justified by the fact that specialisation in trade is, as seen from Table 1b, the only variable which seems to be statistically likely to be endogenous to the culture variable (besides the historic variable of distance). If, however, the theoretical claim that all specialization is culturally endogenous is true, then we might be venturing into an under-identification problem with more endogenous variables than instruments. That is why, alternatively, and secondly, we estimate the same model of total employment explained by GVA and cultural impact on occupation and specialisation, but this time the latter is approximated directly by the distance to the cultural corridor. The dummy variables for specialisation are used here only as instruments for distance to the cultural

corridor. We can statistically and theoretically afford this specification, because GVA already almost completely explains total employment, while specialisation might also explain total employment but not the other way around, which is the first reason why we use the specialisation as a regressor on the right hand side. Thus, our alternative specification of a 2SLS IV model is an over-identified, theoretically consistent and statistically reasonable one.

The degree to which we have managed to tackle the potential problems around our instrumental variables and their suitability for the model is further examined after the main estimations with the standard tests: the Hausman test for endogeneity (comparing the OLS and the IV estimates); the B-W-H tests for exogeneity (checking if cov(xe) is different from 0); and the over-identification test for the second alternative, where we have more than one instrumental variable. Additionally, weak instruments tests were also conducted, as the correlations, especially between some of the specialisation dummies and the distance variable, are low. The last test here was to conduct a special probit-based IV estimation for the case when our dependent endogenous regressor is a dummy for trade specialisation (i.e. for our just-identified specification). The main IV estimation results and the aforementioned post-estimation tests are described in detail below in Section 4.1.2.

4.1.2 Test with a Just-Identified 2SLS Model

Table 2 presents the just-identified specification where distance to the cultural corridor is an instrument for specialisation in trade. Table 3 presents the alternative over-identified specification, where distance to the cultural corridor is instrumentalised with the six dummy variables for specialisation.

+++ insert Table 2 about here +++

As we can see from Table 2 above, first in OLS and then in a just-identified 2SLS IV specification, when we regress total employment on GVA, the impact of GVA is strongly statistically significant and positive. The impact of sector spacialisation varies, however, and, especially after the instrumentalisation of specialisation in trade with the distance to the cultural corridor, the effect of specialisation in trade on total employment shows a sign change and becomes negative. This is a clear indication that specialisation in trade is indeed culturally endogenous. The impact from the other

specialisations remains relatively stable across methods, but only specialisation in agriculture loses its significance under the IV procedure. For the remaining sectors: specialisation in construction is a stable positive factor for total employment, while specialisation in finance, non-market activities and industry has a stable negative association with total employment, regardless of the involvement of our instrumental variable. These results are plausible, as the post-communist period in this region was marked by a decline of industry in Romania and Bulgaria, and, subsequently, an outflow of employment, while the other two sectors are, respectively, underdeveloped (the financial sector) and traditionally lower paid (non-market services), and it is therefore natural to be associated with a negative effect on total employment in the countries of interest. Meanwhile, we have year, country, and capital city controls, where the latter has a strong positive association with employment which is a good sign for the reliability of our results, capturing the expected agglomeration biases. The main conclusion from this exercise is that economic structure is indeed culturally embedded, i.e. a culturally endogenous and biased process[16].

The post-estimation tests for endogeneity also support the need for the instrumentalisation of specialization in trade with distance to the cultural corridor. They find an F-statistic well above 10 (194) which indicates that distance to the cultural corridor is not a weak instrument. Still, we are alerted by the loss of significance of specialisation in agriculture in the presence of the instrument, which might mean that an other specialisation dummy, besides the trade-related one, is endogenous to culture, even if the statistical characteristics of the agricultural variable do not suggest this. To secure triangulation of our results, we infer an over-identified alternative to the same model. We do this by switching the place of what is endogenous factor under investigation and what an instrument from the first specification presented in Table 2. Plus, we expand the theoretical motivation of the instrument and include a higher number of instruments, thus arriving at an over-identified

[16] The estimations with a probit model and instrumental variable were consistent in their economic interpretation with the results presented here. Still, we need to compare Table 2 and Table 3; the latter over-identified specification follows the OLS, 2SLS presentation, and therefore we present here the OLS vs 2SLS results for the just-identified specification as well.

specification. We adopt this approach in spite of the lack of high correlation between distance to the cultural corridor and specialisation in trade, because theoretically it is justifiable that agriculture is the traditionally important sector in urban economics models[17] and the Weberian hypothesis about the cultural impact on occupational choice per se suggests there is a link between cultural attitudes and any form of labour specialisation[18].

4.1.3 Test with an Over-Identified 2SLS Model

Table 3 presents the new over-identified specification results.

+++ insert Table 3 about here +++

Table 3 above presents an OLS, and then a 2SLS IV estimation, where total employment is regressed on GVA and distance to the cultural corridor, while the distance is instrumentalised with the dummies for sectoral specialisation. This over-identified specification presents exactly the same results as the just-identified specification from Table 2 with regard to the relationship between total employment and GVA, as well as between total employment and the control variables year, country and capital city. The difference is, however, in the effect on total employment of the distance to the cultural corridor. As we see, this regressor changes sign after instrumentalisation, which supports the endogeneity assumption, but it has no association with the dependent variable total employment. This is actually a sign that distance to the cultural corridor is indeed a very good instrument in the setting of the just-identified specification. Moreover, this result demonstrates that there is no direct cultural persistence effect. The cultural impact exists only as a latent path-dependence driver of a Weberian effect on specialisation in trade. Yet, our post-estimation tests for endogeneity and over-identification as well as the weak instrument tests, all perform satisfactorily. This means that there is still reasonable support for the theoretical claim of Weber for a specialisation and culture relationship per se. Yet, this also means that our results based on the 2SLS need further empirical triangulation. That is why

[17] Indeed, trade and industry are often the cornerstones for urban and regional models, accounting for physical factors such as geographical location, proximity to rivers, seas etc. However, going back to basics, life and then trade became possible because there was a surplus of agricultural produce.

[18] It is noteworthy that the same IV estimation with an alternative dependent variable – population density – also registers also a significant value of the cultural corridor in the second equation, after it has been cleaned from endogeneity as a measure. This means that the effect from the cultural corridor is rather on population than on the skilled population in particular. Results available from the authors upon request.

we direct ourselves towards the implementation of another suitable for handling endogeneity estimation method: a propensity-score-matching method combined with a difference-in-differences approach.

4.2 A Propensity-Score-Matching and Difference-in-Differences Approach

4.2.1 Propensity-Score-Matching Approach

Propensity-score-matching is a method that allows us to analyse the average effect of the distance to the cultural corridor (which is our treatment) for the total employment in the NUTS 3 regions under investigation (which is the output). We divide these regions into two groups according to a maximum distance to the corridor. Regions within this maximum distance are considered to have received the treatment, the rest fall into the category of a control group. We try three alternative maximum distance definitions (10km, 15km and 20km), which are, respectively, denoted as treatment 1, treatment 2 and treatment 3. These are three alternative quantifications of the distance to the cultural corridor as a treatment effect for local employment. The aim is to estimate a probit model $p(x) = prob(D = 1|x) = E(D|x)$, where x is a vector of the relevant characteristics of the regions, e.g. GVA and sector specialisation. In other words, we want to see if the local productivity is explained by the distance to the cultural corridor or not. As we have observational data (and not a controlled experiment), it is essential that our matching is done on the basis of x, and not only the output variable). In other words, we want to match NUTS regions that are comparable in terms not only of output (GVA) but also the regional characteristics of the economic structure[19]. The matches for the treated observations among the propensity scores of the controlled observations and their characteristics will also be made only within a certain common support interval, meaning that we restrict the comparison range and consider only the propensity levels inside the interval in which we have observations to match on. Under this setting, we use three alternative methods of matching: nearest neighbour (identifying the closest propensity score for the treated observation among the controlled ones, given the x characteristics),

[19] As mentioned previously, controls for year, country, and capital city were used across all specifications.

Kernel matching (which takes all propensity scores, weighting them according to their best matching to the propensity score of the treated observation), and stratified matching (where the matching is done only with those control observations within the same strata as the treated observation in terms of propensity score stratification). Tables 4a,b&c depict the way treatment and control groups are statistically characterised under the three alternative definitions of the maximum distance from the cultural corridor treatments 1,2 &3, respectively.

+++ insert Table 4a&b&c about here +++

As we see from Table 4a,b&c, the treated group always has a higher total employment, with a lower GVA than the control group, and has a higher specialisation in trade, construction, and financial services than the control group, while agricultural specialisation is at the same level for both the treated and the controlled groups. The latter might be explained by the fact that agriculture depends on the availability of land, while the other specialisations are more a question of occupational choice preferences than the physical endowments of the place. We also notice that the differences increase when we increase the maximum distance, but this might mean mostly that our number of controls will be decreasing, as well as our common support interval. Yet, it also means that the distance to the cultural corridor is likely to be of significance for the propensity of total employment. In the next step, we estimate the propensity scores for total employment controlled for the x characteristics (GVA and sectoral specialisation dummies) and the relevant year, country and capital city controls, and implement the three types of matching: nearest neighbour, Kernel, and stratified matching, presented, respectively, by treatment 1, treatment2 and treatment 3 in Table 5 below.

+++ insert Table 5 about here +++

Table 5 presents both a simple t-test where matching is based only on propensity scores, and a test where the propensity is controlled for the x vector of variables. In addition, Table 5 presents the one-period and two-period (difference-in-differences) results. Namely, the first estimation looks at the available data as a pooled cross-section of treated and not treated regions, and considers the level of total employment as an outcome variable. For the difference-in-differences estimation, we take as an

outcome the difference in total employment within 1 year for every year for which the data is available in our data set.

When matched on propensity scores and x variables, as seen from Column 1 in Table 5, we observe a high positive significance of the treatment effect on total employment, which, on average, amounts to about 14, 15 and 30 thousand more employed people per treated region, and this varies depending on the method and the treatment definition concerned. This means that the regions closer to the cultural corridor experience a higher level of total employment. Moreover, we see an interesting effect that, with an increase of the maximum distance we actually observe an increase of the effect, which means that there are no indication of a decline of the effect with distance. In other words, the effect is very robust and better captured, when a bigger sample is analysed as a treated group.

4.2.2 Difference-in-Differences Approach

The difference-in-differences results in Column 2 of Table 5 point to another interesting observation. The change in employment, i.e. the employment growth, is again significantly, but this time negatively, associated with the treatment effect. This means that, while enjoying a higher total employment, those regions which are closer to the cultural corridor experience a slower growth of employment. This evidence, seen from the perspective of the entrepreneurial cultural milieu which claims that, in a broader sense, past centres of productivity shape current centres of productivity and employment, can be interpreted as a relationship between distance to the corridor and what can be thought of as an economic life cycle of the region. The regions closer to the cultural corridor have higher level of employment, as expected from the hypothesis that there is a long path-dependent process of cultural impact (i.e. from proximity to places of past-times of socio-economic productivity). The effect is registered better for places closer in distance to the cultural corridor. In a sense, they experience a 'cash cow' life-cycle stage, where their total employment is higher due to an accumulated past history of socio-economic development. The newly growing centres of employment are elsewhere, but they are still in a developing stage, and therefore still lag behind the cash-cow life-cycle regions. Put in a broader perspective, our result supports the proposition that culture is a source

of a certain persistence chain[20] (i.e. the distance to the cultural corridor is associated with higher total employment). Yet, there is a slow trend of change captured by the slower growth of employment in the treated regions. The latter means that, over time, new spatial foci of socio-economic development may emerge. These new foci are currently still accumulating socio-economic conditions that will trigger the new socio-economic geography, but with the path-dependent character of their local development. These results corroborate the findings of Cuberes (2011), who observed: 'At some point, the growth rate of this city slows down and the second-largest city then becomes the fastest-growing one. Eventually, the third-largest city starts growing fast as the two largest cities slow down'[21]. Moreover, we find a link between this pattern in the development of local centres and their proximity to what is termed here a 'cultural corridor'.

In general, our last result is consistent with the fact that the main assumption regarding the treatment effect is significant (which we observe with regard to distance to the cultural corridor), and this is the assumption of partial equilibrium (see Nijkamp, 2007). In other words, the cultural treatment investigated here does not deterministically drive the observations in a constant manner, but is actually conditional on independent current development assumptions. However, it still holds as a factor of influence on total employment in the regions[22].

4.2.3 Synthesis

[20] 'Persistence chain' is called a 'chain' for the same reasons it is in the term 'Markov chain', in the sense that a persistence chain characterises a persistent process over a limited period of time. The economic processes happen much faster than social change. Thus the value change for a certain period of time is negligible. During this period, a persistence-similar process endures. Put differently, in a cross-sectional environment a persistence effect can be traced due to the existence of the persistence chains. However, in a time-series or a panel environment with a long enough period of observation so that cultural change is captured (over 20 years – see Hauser 2013), then several path-dependent chains can be observed, which actually build up the path-dependence phenomenon of cultural impact.

[21] The findings of Cuberes (2011) concern, among other countries, Bulgaria for the period 1888 – 1990, Bulgaria is one of the three countries through which the cultural corridor, examined in this paper, passes through geographically. Furthermore, with respect to Bulgaria, the las few decades in Cuberes's database coincide with the time period covered by our dataset too. And our dataset and this of Cuberes (2011) are from different sources. Therefore, we consider our result as an interesting triangulation of the result from 2011.

[22] The other three assumptions of unconfoundedness (the treatment does not act on the control group), overall existence assumption (i.e. there are suitable matches) , and the balancing assumption (comparable number of matches per observation) are within acceptable margins of fit with our data, though not to an ideal degree (especially with regard to the balancing assumption). Still, we implement robustness control, and the resulting overall consistency is a sign of the general reliability of the results.

As a final comment on the robustness of the results, we should note that our common support interval is rather large, which means we can use almost the whole control group for the matching exercise. This common support naturally decreases when we enlarge the treatment group, but it is interesting that the interval decreases first from above (when we increase the definition of maximum distance to the cultural corridor from 10km to 15km), and then it decreases from below (when we increase this further from 15km to 20km for treatment 3). This, even though remotely, can still be a sign for the dying-off of the cultural effect, where the leading and the worst-performing regions of the treated group do not easily find a match among the control group. Put differently, there are both 'cash-cows' and 'falling stars' life-cycle regions among the treated regions.

In summary, our propensity-score-matching and difference-in-differences estimations had two functions. They triangulated and supported the results from the 2SLS IV estimations, confirming the cultural effect of distance to the cultural corridor on the local total employment. In addition, they provided further insight into the pattern of cultural impact, which is characterised as one of path dependence related to social change and a chain of economic development, rather than to a fixed deterministic persistence effect[23]. Nevertheless, the effect of the distance from the cultural corridor,

[23] It should be noted that the notions of path dependence and persistence are not clearly distinguished in the literature (see Freeman 2012). We follow here the CBD definitions for the distinction between the two notions. Schematically, this distinction can be described as follows. 'Persistence' means a strictly repetitive effect of culture on choice over time. Under cultural persistence, over time a locality will always exhibit x% preference for the consumption of, say, fruit over meat; x will be a constant. Under cultural path-dependence, x will change its value over time; thus the local preference for fruit over meat will have to be expressed as $f(\Sigma(\Delta x))$. Finally, a path-dependence built up of persistence chains is a subcase of the latter. A cultural path-dependence of cultural persistence chains is basically an analogous to a Markov chain process. In this case $f(\Sigma(\Delta x))_{t(1 \text{ to } m)}$, where t denotes a time period and in t_1 to t_n, $x_{(1 \text{ to } n)} = a$, and a is a constant; in t_{n+1} till t_{n+m}, $(m>0)$, $x_{(n+1 \text{ to } n+m)} = b$, and a and b are different. Thus, the cultural path dependence of cultural persistence chains reflects a process where change in the cultural factor happens very slowly over time, and for some periods there is no change. In other words, this path denendence built up of persistence chains is a path dependence of no-change periods which, however, have a beginning and an end, and the level of the cultural attitude changes only over longer periods of time, within which a series of economic changes take place. In a sense, this notion expresses that time flows slower for cultural change than for economic change. That is why some periods of economic development seem to happen under conditions where there is a lack of cultural change, but this is only a temporary chain of persistence. The cultural effect

at a fixed moment in time and space, even if only a path-dependent (persistence chain only) effect, is still a very strong predictor of local output. A spatial panel exploration or a generalised method of moments (GMM) panel estimation with a varying cultural component could be a promising continuation that may cast further light on the findings reported here regarding the cultural impact mechanism of persistence chains.

5 Conclusion

The present paper has made an attempt to offer a novel quantification of the analysis of the 'cultural factor', by including in a cultural corridor context the Culture-Based Development (CBD) concept. The paper aimed to enhance our understanding of culture as a factor variable capturing the cultural milieu and related cultural assets clustered in a locality over time. It provides an argumentation for the conceptual acceptability of this quantification, and for using it to explore the effect of a cultural corridor on local employment in Greece, Bulgaria and Romania. The paper gives clear econometric evidence in support of the generally accepted notion in economics – usually tested in many geographical case studies – that culture matters. Our study is both consistent with existing evidence and original in terms of both its quantitative approach and the selected geographical scope of analysis. In other words, our results support our working hypothesis, and demonstrate that the distance to the East Trans Balkan cultural corridor is associated with economic benefits (in terms of employment gains) for those regions or localities which are situated closer to the corridor.

It should also be added that interesting insights on the cultural effect are evolving from the analysis conducted. First, sector specialisation and past cultural development are both confirmed to be culturally endogenous, which supports the general place-based development hypothesis and its relationship to the notion of local culture. Second, our results caution against a cultural determinism

on socio-economic development is actually further back in time, and is only path-dependent and not deterministically persistent.

approach, and rather suggest a cultural persistence chain (path dependence) to be a more likely process to describe the cultural impact on place development. Third, and particularly interesting, is the finding that the local socio-economic life-cycle is likely to be associated with historic cultural centres as a treatment effect. This would mean that indeed, for a certain period of time, the established cultural and socio-economic centres remain a source of culturally-dependent prominence for these localities and their immediate vicinity. Additionally, social change – even though normally much slower than regular economic processes – still does take place, while also newly emerging social and economic centres are possible and indeed likely to develop. And, fourth, the change in, and magnitude of, cultural impact on place development is highlighted as being dependent not directly on the geographical proximity to the cultural corridor, but on the Weberian occupational cultural choice approximated here by the local sectoral specialisation. The consistent results by means of the methods and specifications included in our paper suggests that it would be useful to do further work on cultural impact studies regarding the local socio-economic development, in particular, development in the South East Europe (SEE) region. Clearly, the current work offers a promising foundation for more methodological triangulations and inferences on the distance to the cultural corridors in SEE, and elsewhere, where cultural corridors exist. Furthermore, the current results give rise to intriguing questions on the effect of distance to cultural corridors in SEE, in relation to other culturally-sensitive processes, such as migration and innovation, the first giving rise to the shrinking regions phenomenon in these geographical areas, and the second one being a main driver for economic growth and development per se.

Finally, the very cultural corridors notion proposed here is a conceptual novelty that is worth further consideration in regional research. Cultural corridors, known in other disciplines and touching on economics mostly through cultural tourism and geography, offers a more spatially connected and realistic notion of cultural capital at the local level. Cultural variation exists on every level of aggregation from the individual level onwards: group, neighbourhood, region, and country. There are, for example, undeniable local dialect differences in most countries, and this applies to many other historical cultural differences, even though this is less obvious at first sight. The cultural corridor

tracks (records) the concentration of cultural capital across space and time, and recognises its cumulative character and interconnectedness. Thus, the cultural corridor location can provide more meaningful information than the abstract distance to a single geographic location, for example, especially given that different locations were culturally prominent in the history at different times for different reasons. It is difficult to argue which of them should be more important than the others. Furthermore, leading international experts in history, cultural heritage, and architecture have already mapped out the existing cultural corridors across all localities of the member countries of the Council of Europe (see http://seecorridors.eu/?w_l=2). Yet, the information about these corridors remains till now, to our knowledge, unexploited in most applied quantitative spatial-economic and econometric research. Consequently, appropriate and comprehensive insight into cultural influences on the local – and regional - economic development in these localities is still insufficient. And finally, our operationalization shows that yet another quantification, even closer to the OIE definition, can very well be offered as an answer to Adkisson (2014) question on the feasibility of bridging empirics and institutional economics.

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Table 1a: Basic descriptive statistics of the compiled data set

Variable	Obs	Mean	Std.Dev.	Min	Max
emp_t	2850	130.097	140.24	2.075	1124.790
loc_size	2850	0.024	0.02	0.003	0.165
sitrade_d	2850	0.379	0.49	0.000	1.000
gva	2850	235.699	325.52	10.770	4756.740
siagr_d	2850	0.526	0.50	0.000	1.000
siconstr_d	2850	0.384	0.49	0.000	1.000
siind_d	2850	0.445	0.50	0.000	1.000
sifin_d	2850	0.259	0.44	0.000	1.000
sinon_m_d	2850	0.474	0.50	0.000	1.000
capital	2850	0.014	0.12	0.000	1.000
country_d_bg	2850	0.196	0.40	0.000	1.000
country_d_gr	2850	0.509	0.50	0.000	1.000
distance~ast	2850	163623.400	185309.90	87.700	663000.000

The table presents the descriptive statistics for the main explanatory variables used in our analysis, namely: emp_t – total employment, loc-size – number of people in a locality, gva – gross value added; sitrade_d – dummy variable for specialisation in trade; siagri_d – dummy variable for specialisation in agriculture; siconstr_d – dummy variable for specialisation in construction; siind_d – dummy variable for specialisation in industry; sifin_d – dummy variable for specialisation in finance; sinon_m_d – dummy variable for specialisation innon-market services; capital – dummy variable for capital city; country_d_gr – dummy variable equal to 1 if country is Bulgaria; country_d_gr – dummy variable equal to 1 if country is Greece; distance_to_east – calculated distance from the centroid of NUTS 3 to the polyline composed of the geo-data of the points contained in the East Trans Balkan cultural corridor.

Source: Authors' calculations.

Table 1b: Correlations between main variables

	dist~ast	sitrad~d	siagr_d	sicons~d	siind_d	sifin_d	sinon_~d
distance~ast	1						
sitrade_d	0.21	1					
siagr_d	0.06	-0.49	1				
siconstr_d	0.13	0.26	-0.36	1			
siind_d	-0.37	0.11	-0.42	0.06	1		
sifin_d	0.11	0.08	-0.24	0.01	0.05	1	
sinon_m_d	-0.12	-0.05	-0.27	0.08	0.22	0.41	1

The table presents the correlation coefficients between the culturally endogenous variables (dummy variable for sectoral specialisation listed in Table 1a) and the intended instrumental variable – distance to the cultural corridor (described in detail in Table 1a).

Source: Authors' calculations.

Table 2: 2SLS IV – Just-Identified Specification

	OLS		2SLS			
dep.var.	emp_t		sitrade_d		emp_t	
	coef.	t-value	coef.	t-value	coef.	z-value
sitrade_d	14.2	5.34	-	-	-35.2	-3.26
gva	0.2	48.27	0.0002	8.97	0.2	42.60
siagr_d	27.7	9.30	-0.474	-25.79	3.6	0.60
siconstr_d	14.0	5.67	0.052	3.09	17.4	6.44
siind_d	-8.2	-3.28	0.022	1.25	-10.4	-3.90
sifin_d	-12.2	-4.29	-0.036	-1.86	-12.9	-4.29
sinon_m_d	-11.2	-4.51	-0.159	-9.48	-20.4	-6.26
distancetoeast	-	-	8.53E-07	14.25	-	-
capital	409.6	39.01	0.270	3.76	421.4	37.21
country_d_bg	-111.6	-34.96	-0.021	-0.98	-113.5	-33.56
country_d_gr	-223.4	-78.59	-0.167	-6.92	-221.6	-73.50
_cons	167.8	25.92	0.474	10.89	195.6	21.74
Year dummies	Yes		Yes		Yes	
F (or chi)	(38,2811) = 384.84		(38,2811) = 43.46		chi2(38) = 13195.83	
Prob>F (or Prob>	0.0000		0.0000		0.0000	
R-squared	0.8388		0.3701		0.8191	
Adj R-sqaured	0.8366		0.3615		-	
Root MSE	56.69		0.3877		59.644	
N	2850		2850		2850	
***D-W-H test for endogeneity						
	-		Durbin	chi2(1) = 25.1715		(p =0,0000)
			Wu-Hausma	F(1,2810) = 25.0394		(p =0,0000)
***exogeneity test - ols residual						
	-			F(1,2818) =	236.38	
				Prob>F =	0.0000	
***weak instruments test - estat						
	-			Robust F(1,2811)	Prob>F	
				194.2	0.0000	

The table presents the results from a 2SLS IV estimation where the endogenous variable is specialisation in trade in the region, and the instrument for this is the distance to the East Trans-Balkan cultural corridor. Post-estimation tests for endogeneity and weak instruments are presented.

Source: Authors' calculations.

Table 3: 2SLS-IV Over-Identified Specification

	OLS		2SLS			
dep.var.	loc_size		distancetoeast		loc_size	
	coef.	t-value	coef.	t-value	coef.	z-value
distancetoeast	-6.80E-09	-4.23	-	-	1.99E-08	4.69
gva	4.76E-05	64.45	-45.8	-5.55	4.87E-05	61.91
sitrade_d	-	-	78972.2	14.25	-	-
siagr_d	-	-	20841.2	3.36	-	-
siconstr_d	-	-	13310.7	2.59	-	-
siind_d	-	-	-75085.5	-14.38	-	-
sifin_d	-	-	27878.8	4.71	-	-
sinon_m_d	-	-	-15510.3	-2.99	-	-
capital	0.04	19.54	-53412.7	-2.44	0.04	18.32
country_d_bg	0.02	29.38	-16972.9	-2.55	0.02	29.01
country_d_gr	-0.01	-9.49	235539.2	39.81	-0.01	-10.81
_cons	0.01	7.39	60851.5	4.52	0.01	5.77
Year dummies	Yes		Yes		Yes	
F (or chi)	0.0000		0.0000		0.0000	
Prob>F (or Prob>chi)	(33,2816) = 238.55		(33,2811) = 111		chi2(33) = 7263.51	
R-squared	0.7365		0.6001		0.7108	
Adj R-sqaured	0.7334		0.5947		-	
Root MSE	0.01095		118000		0.0114	
N	2850		2850		2850	
***D-W-H test for endogeneity						
	-		Durbin	chi2(1) = 51.6426		(p =0,0000)
			Wu-Hausr	F(1,2815) = 51.9497		(p =0,0000)
***exogeneity test - ols residual						
	-			F(1,2813) =	149.93	
				Prob>F =	0.0000	
***over-identification restrictions						
	-		Hansen's J	chi2(5) = 39.5902		(p = 0,0000)
***weak instruments test - estat						
	-		Robust F(6,2811)		Prob>F	
				79.7469	0.0000	

The table presents the results from a 2SLS IV estimation where the cultural factor impact (approximated by the distance to the East Trans-Balkan cultural corridor) is instrumentalised with the sectoral specialisation across regions. Post-estimation tests for endogeneity and weak instruments are presented.

Source: Authors' calculations.

Table 4a: Descriptive Statistics for Distance to Cultural Corridor – Treatment 1 (10km)

	treatment1	Freq.	Percent		
	0	2,755	78.51		
	1	754	21.49		
	Total	3,509	100		

Variable	Obs	Mean	Std.	Dev.	Min
treatment1	0				
emp_t	2330	115.8802	121.785	2.075	908.895
gva	2330	246.7625	318.6188	13.145	4756.74
sitrade_d	2755	0.482396	0.499781	0	1
siagr_d	2755	0.615608	0.48654	0	1
siconstr_d	2755	0.479855	0.499685	0	1
siind_d	2755	0.474773	0.499454	0	1
sifin_d	2755	0.380762	0.485662	0	1
sinon_m_d	2755	0.550635	0.49752	0	1
capital	2755	0.010526	0.102075	0	1
country_d_bg	2755	0.126316	0.332265	0	1
country_d_gr	2755	0.536842	0.498731	0	1
treatment1	1				
emp_t	520	193.801	190.8637	43.955	1124.79
gva	520	186.1277	350.8864	10.77	2718.31
sitrade_d	754	0.543767	0.498411	0	1
siagr_d	754	0.611406	0.487754	0	1
siconstr_d	754	0.572944	0.494979	0	1
siind_d	754	0.820955	0.383645	0	1
sifin_d	754	0.462865	0.49895	0	1
sinon_m_d	754	0.65252	0.476486	0	1
capital	754	0.038462	0.192435	0	1
country_d_bg	754	0.615385	0.486827	0	1
country_d_gr	754	0	0	0	0

The table presents descriptive statistics for the treated (treatment 1 = 1) and control (treatment 1 = 0) groups for the case when treatment (treatment 1) is defined with a maximum distance of 10 km from the East Trans-Balkan cultural corridor.

Source: Authors' calculations.

Table 4b: Descriptive Statistics for Distance to Cultural Corridor – Treatment 2 (15km)

	treatment2	Freq.	Percent		
	0	2,523	71.9		
	1	986	28.1		
	Total	3,509	100		
Variable	Obs	Mean	Std. Dev.	Min	Max
treatment2	0				
emp_t	2161	108.936	115.4554	2.075	908.895
gva	2161	251.9512	328.1005	13.145	4756.74
sitrade_d	2523	0.473643	0.499404	0	1
siagr_d	2523	0.60761	0.48838	0	1
siconstr_d	2523	0.48474	0.499866	0	1
siind_d	2523	0.472057	0.499318	0	1
sifin_d	2523	0.382085	0.485993	0	1
sinon_m_d	2523	0.544986	0.498071	0	1
capital	2523	0.011494	0.106614	0	1
country_d_bg	2523	0.114943	0.319016	0	1
country_d_gr	2523	0.574713	0.494485	0	1
treatment2	1				
emp_t	689	196.4683	183.7713	43.955	1124.79
gva	689	184.7262	312.0946	10.77	2718.31
sitrade_d	986	0.551724	0.49757	0	1
siagr_d	986	0.63286	0.48227	0	1
siconstr_d	986	0.53854	0.498766	0	1
siind_d	986	0.74645	0.435264	0	1
sifin_d	986	0.440162	0.496659	0	1
sinon_m_d	986	0.643002	0.479357	0	1
capital	986	0.029412	0.169044	0	1
country_d_bg	986	0.529412	0.499388	0	1
country_d_gr	986	0.029412	0.169044	0	1

The table presents descriptive statistics for the treated (treatment 2 = 1) and control (treatment 2 = 0) groups for the case when treatment (treatment 2) is defined with a maximum distance of 15km from the East Trans-Balkan cultural corridor.

Source: Authors' calculations.

Table 4c: Descriptive Statistics for Distance to Cultural Corridor – Treatment 3 (20km)

	treatment3	Freq.	Percent		
	0	2,320	66.12		
	1	1189	33.88		
	Total	3,509	100		
Variable	Obs	Mean	Std.Dev.	Min	Max
treatment3	0				
emp_t	2012	98.62157	98.54083	2.075	528.321
gva	2012	250.8117	332.9956	13.145	4756.74
sitrade_d	2320	0.4625	0.498699	0	1
siagr_d	2320	0.6125	0.487284	0	1
siconstr_d	2320	0.469397	0.49917	0	1
siind_d	2320	0.45	0.497601	0	1
sifin_d	2320	0.383621	0.486372	0	1
sinon_m_d	2320	0.530603	0.49917	0	1
capital	2320	0	0	0	0
country_d_bg	2320	0.0875	0.282627	0	1
country_d_gr	2320	0.6125	0.487284	0	1
treatment3	1				
emp_t	838	205.6693	188.4474	27.788	1124.79
gva	838	199.4151	303.9831	10.77	2718.31
sitrade_d	1189	0.560135	0.49658	0	1
siagr_d	1189	0.619008	0.485835	0	1
siconstr_d	1189	0.559294	0.496681	0	1
siind_d	1189	0.742641	0.437363	0	1
sifin_d	1189	0.42725	0.494887	0	1
sinon_m_d	1189	0.654331	0.475786	0	1
capital	1189	0.048781	0.215499	0	1
country_d_bg	1189	0.512195	0.500062	0	1
country_d_gr	1189	0.048781	0.215499	0	1

The table presents descriptive statistics for the treated (treatment 3 = 1) and control (treatment 3 = 0) groups for the case when treatment (treatment 3) is defined with a maximum distance of 20km from the East Trans-Balkan cultural corridor.

Source: Authors' calculations.

Table 5: Propensity Score Matching & Diff in Diff - Distance to Cultural Corridor as a Treatment for Total Employment

Treatment 1				
Est. method	Differences using 1 period data		Differences using 2 period data	
T-test	77.9208	*	-1.922724	*
Reg. , dummy&controls	9.497868	*	-2.044036	*
ATT nearest neighbour	3.587	*	-3.056	*
ATT Kernel matching	14.166	*	-2.191	*
ATT Stratified Matching	14.696	*	-2.278	*
common support				
	[.05320394,	.99136058]	[.05320394,	.99136058]
Treatment 2				
Est. method	Differences using 1 period data		Differences using 2 period data	
T-test	87.53229	*	-2.314724	*
Reg. , dummy&controls	17.22185	*	-1.762348	*
ATT nearest neighbour	15.366	*	-1.806	
ATT Kernel matching	15.28	*	-1.494	*
ATT Stratified Matching	15.254	*	-1.402	
common support				
	[.00913926,	.79163732]	[.00913926,	.79163732]
Treatment 3				
Est. method	Differences using 1 period data		Differences using 2 period data	
T-test	19.8	*	-1.496572	*
Reg. , dummy&controls	25.48063	*	-1.043016	
ATT nearest neighbour	34.522	*	-1.161	
ATT Kernel matching	30.381	*	-0.628	*
ATT Stratified Matching	38.504	*	-0.892	*
common support				
	[.02287165,	.88621778]	[.02287165,	.88621778]

The table presents the coefficients and significance level for the treatment, analysed with alternative methods for estimating the average treatment effect on the treated. The methods presented: t-test (directly repressing outcome on the propensity), a simple regression with controls, and then comes the propensity score matching implemented with the methods: nearest neighbour, Kernel matching, and stratified matching. The first column presents one period of observations. The second column presents the difference-in-differences estimation for a change in employment over 1 year. The common support represents the interval of propensity within which the matching is implemented All propensity score matching implementations involve controls for sector specialisation and GVA on the NUTS 3 level.

Source: Authors' calculations.